

# PATENT SPECIFICATION



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## COMPLETE SPECIFICATION

### Conduit Fastener

I, FRANK BERNHARD DEHN, M.Sc., Ph.D., F.I.C., Chartered Patent Agent, of Kingsway House, 103 Kingsway, London, W.C.2, a British Subject, do hereby declare the nature of this invention (a communication to me from ADEL PRECISION PRODUCTS CORP., a corporation duly organized under the laws of the State of California, of 10777 Van Owen Street, Burbank, State of California, United States of America), and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The present invention relates to an improved conduit fastener or clip of the type shown in British Patent Specification No. 522,908 in which a conduit clip is formed by the combination of a metal strap combined with an insulating cushioning member and with a grounding strip closely associated with the cushioning member. In the above mentioned specification the cushioning member is provided with overhanging flanges in opposition to lateral portions of the back of the channel shaped cushioning member so that the strap member can only be inserted into proper position by prying these overhanging flange portions away from the back portions.

According to the present invention there is provided a clip for securing a metallic conduit to a structural part by means of a metallic strap, a cushion member of insulating material combined with the strap and a grounding strip united with the insulating cushion member, characterised by the fact, that the strap is provided with flange portions deflected from the plane of the entire clip and in contact with lateral wall portions of the cushion member for holding the cushion member and strap against relative axial displacement while permitting these members to be positioned one within the other without requiring insertion of portions of one member into specially prepared cavities of the other member.

With the foregoing objects in view, together with such other objects and advantages as may subsequently appear, the invention is carried into effect as

illustrated by way of example in the accompanying drawing, in which :

Fig. 1 is a fragmentary perspective view of a clip embodying my invention, as when in use ;

Fig. 2 is a vertical section of the clip as when not in use ;

Fig. 3 is a sectional view on the line 3—3 of Fig. 1 ;

Fig. 4 is an enlarged fragmentary vertical section of the clip, as when in use, showing also a part of the conduit ;

Fig. 5 is a fragmentary perspective view of a modified form of clip as when in use ;

Fig. 6 is a vertical section of the clip of Fig. 5 as when not in use ;

Fig. 7 is a sectional view on the line 7—7 of Fig. 5 ;

Fig. 8 is an enlarged fragmentary section of the clip of Fig. 5 as when in use ;

Fig. 9 is a fragmentary perspective view of another modified form of the invention as when in use ;

Fig. 10 is a vertical section of the clip of Fig. 9 as when not in use ;

Fig. 11 is a cross section on the line 11—11 of Fig. 9 ;

Fig. 12 is a cross section on the line 12—12 of Fig. 10.

One embodiment of this invention as shown in Figs. 1 to 4 inclusive of the accompanying drawing comprises a bendable resilient metal strap member A having an arcuate loop portion 1 for embracing a metallic pipe or conduit line B and provided with apertured terminals 2 and adapted to be secured by means of a screw 3 or other fastening to and electrically contacted with a metallic structure (Fig. 1) which for example is a structural part C of an airplane or the like.

On the inner periphery of the loop portion 1 is an elongated soft rubber or similar resilient cushion member 4 which substantially surrounds and affords a cushioned support for the conduit, and has associated therewith in the particular manner of this invention a metallic grounding strip 5 arranged to contact the conduit and the strap respectively whereby the conduit will be grounded to the structure C through the strap to prevent dangerous static discharges.

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In accordance with the present invention, the loop or line embracing portion 1 is of channel cross section with its concave side and flanges 6 outermost and the flat or inner side thereof supporting the cushion 4. This cushion is considerably wider than the portion 1 of the strap and is formed of channelled cross section so that the portion 1 may be fitted in the channel thereof with its sides or flanges 6 abutting the inner faces of the flanges 7 on the cushion as shown in Fig. 3. In this manner the loop portion 1 is effectively encompassed by and substantially embedded in the cushion and the interlock of these parts provided by seating the portion 1 in a channel in the cushion as aforesaid prevents relative movement thereof and insures that the cushion will not be dislodged or displaced from the strap incident to vibratory and other stresses which tend to effect a relative movement of the clip and conduit line. Moreover the relatively wide cushion insures a better cushioning support for the line in that it absorbs all vibratory and other stresses in such manner as to provide a permanently secure and reliable vibration proof and static proof anchorage of the line.

In order to present large areas of the metallic grounding strip for electrical contact with the line embracing portion 1 of the strap and the conduit line B respectively, the cushion 4 may be formed with a longitudinal series of spaced openings or slots 8 therein. Through these openings a plurality of folded, looped or doubled back portions 9 of the strip 5 are extended so as to lie folded back on the outer surface of the cushion for contact with the loop portion 1 of the strap, while the remainder of the strip in form of a longitudinal series of segments 10 provides a nearly continuous portion (see Figs. 1, 2 and 4) lying upon the inner surface of the cushion for contact with the conduit. Thus it is seen that a plurality of slightly spaced portions or segments of the strip are disposed on the inner and outer faces of the cushion substantially throughout the length thereof, for contact with the conduit B and loop portion 1 respectively, whereby to insure a good electrical contact with such parts and an effective grounding of the conduit to the structure C. The ends 11 of the grounding strip 5 are bent around the ends of the cushion 4 and lie between the cushion and the strap in contact with the latter as shown in Figs. 2 and 4.

It should be noted that the strip 5 is non-tensioned and is supported by the cushion in such manner that the resilience and cushioning action of the cushion are

not impaired. Moreover, the strip 5 is able to adjust itself relative to the cushion and yet afford an effective ground connection between the line and the strap regardless of distortion thereof and stresses placed on the strip as when tightly clamping the clip on the conduit line, and also due to vibration and other stresses imparted to the line.

In addition to providing for an inter-fitting and interlocking of the strap and cushion to prevent dislodgement thereof, the channelled formation of these parts materially reinforces and strengthens them.

A modified form of clip embodying the present invention, as shown in Figs. 5 to 8 inclusive, follows the same general construction as the form shown in Figs. 1 to 4 inclusive, as to the bendable and resilient metal strap 12 apertured ends 13, fastening 14, rubber or similar cushion 15 and metallic grounding strip 16, except that the strap is channelled so that the concave side and flanges 17 thereof are innermost and encompass the cushion. This cushion is rectangular in cross section and fits in the channel of the strap between the flanges 17 for contact with the conduit line 18. The strip 16 is wound helically around the cushion and therefore presents a plurality of portions on opposite sides of the cushion for contact with the conduit and strap to ground the latter to the metallic structure 19 as shown in Fig. 5.

In this form as in the one first described, the strip is non-tensioned and supported on and by the cushion so as to be able to adjust itself relative thereto and compressed thereon without interfering with a reliable electrical connection thereof between the strap and conduit line.

It should be noted that in this form the portions of the strip 16 crossing the longitudinal edges of the cushion will contact the flanges 17 of the strap as an added electrical connection between the strip and the strap. In this connection it should also be noted that the rubber cushion is compressed when fitted between the flanges 17 whereby it is tensioned and thereby frictionally held in the channel of the strap. This condition also obtains in the form of clip shown in Figs. 1 to 5 inclusive, since the cushion 4 is stretched and thereby tensioned when the loop portion 1 is fitted between the flanges 7.

The helical winding of the metallic strip 16 around the cushion from end to end of the latter makes for a quick and easy assembly of the cushion strip unit and affords a maximum of contacting surfaces between the strip and the conduit line and strap.

Another modified form of clip embodying

the invention hereof is shown in Figs. 9 to 12 inclusive and includes a bendable, resilient metal strap 20 for embracing a conduit line 21, a resilient cushion member 5 22 of soft rubber or the like supported on the strap, a metallic grounding strip 23 carried by the cushion, aperture ears or terminals 24 on the strap and a fastening 25 for securing the strap to and in electrical 10 contact with a metallic structure 26. In this form of clip the line embracing portion 27 of the strap is of channelled form but is arcuate or semi-circular in cross section with its concave side inner- 15 most. The cushion member 22 is of circular cross section and fits in and conforms to the channel formed by the concave side of the line embracing portion 27 of the strap. The metallic strip 23 is 20 wound helically around the cushion from end to end thereof, is non-tensioned and free to adjust itself relative thereto, and like the other forms of the invention affords a plurality of segments or portions 25 which contact the strap and conduit line to insure a reliable grounding of the line through the strap to the structure 26. The sides of the channelled portion 27 act like the flanges in the channelled portion of the 30 strap shown in Fig. 7 to hold the cushion strip unit in place against dislodgement tendencies caused by vibratory and other stresses on the conduit line.

As shown in Fig. 11, the cushion 22 may 35 be compressed so that the conduit engaging portion is flattened when the strap is tightly secured around the line and to the supporting structure 26. This cushion in being of circular cross section affords a 40 full and effective cushioning action and facilitates the incorporation of the grounding strip therewith.

Having now particularly described and ascertained the nature of my said invention 45 and in what manner the same is to be performed, I declare that what I claim is:—

1. A clip for securing a metallic conduit to a structural part by means of a metallic 50 strap, a cushion member of insulating material combined with the strap and a grounding strip united with the insulating cushion member, characterized by the fact, that

the strap is provided with flange portions deflected from the plane of the entire clip 55 and in contact with lateral wall portions of the cushion member for holding the cushion member and strap against relative axial displacement while permitting these mem- 60 bers to be positioned one within the other without requiring insertion of portions of one member into specially prepared cavities of the other member.

2. A clip as claimed in claim 1 in which the cushioning member is of channel 65 formation in cross section with flanges projecting at right angles to the body portion of the channel, the strap member being insertable within the channel with- 70 out deflection of the flanges of the cushion member.

3. A clip, as set forth in claim 1, wherein the strap is of channel or arcuate formation in cross-section with the 75 cushioning member located within the channel or cavity of the strap and abutting the inner faces of the flanges or marginal portions respectively of the strap.

4. A clip, as set forth in claim 1 with a flexible metallic strip serving as a ground- 80 ing means, characterized by the fact that the grounding strip is helically wound about the cushioning member to have portions of its turns in contact with the 85 strap and other portions in contact with the metallic conduit.

5. A clip, as set forth in claim 5, wherein the helical winding of the grounding strip is affected without placing tension 90 thereon to permit the cushion to be readily bent into conformity with the contour of the conduit and strap.

6. A clip, as set forth in claims 1 and 4, wherein the grounding strip lies upon one face of the cushioning member and has 95 doubled portions extending through said member, so that the strip will contact the strap and the conduit respectively.

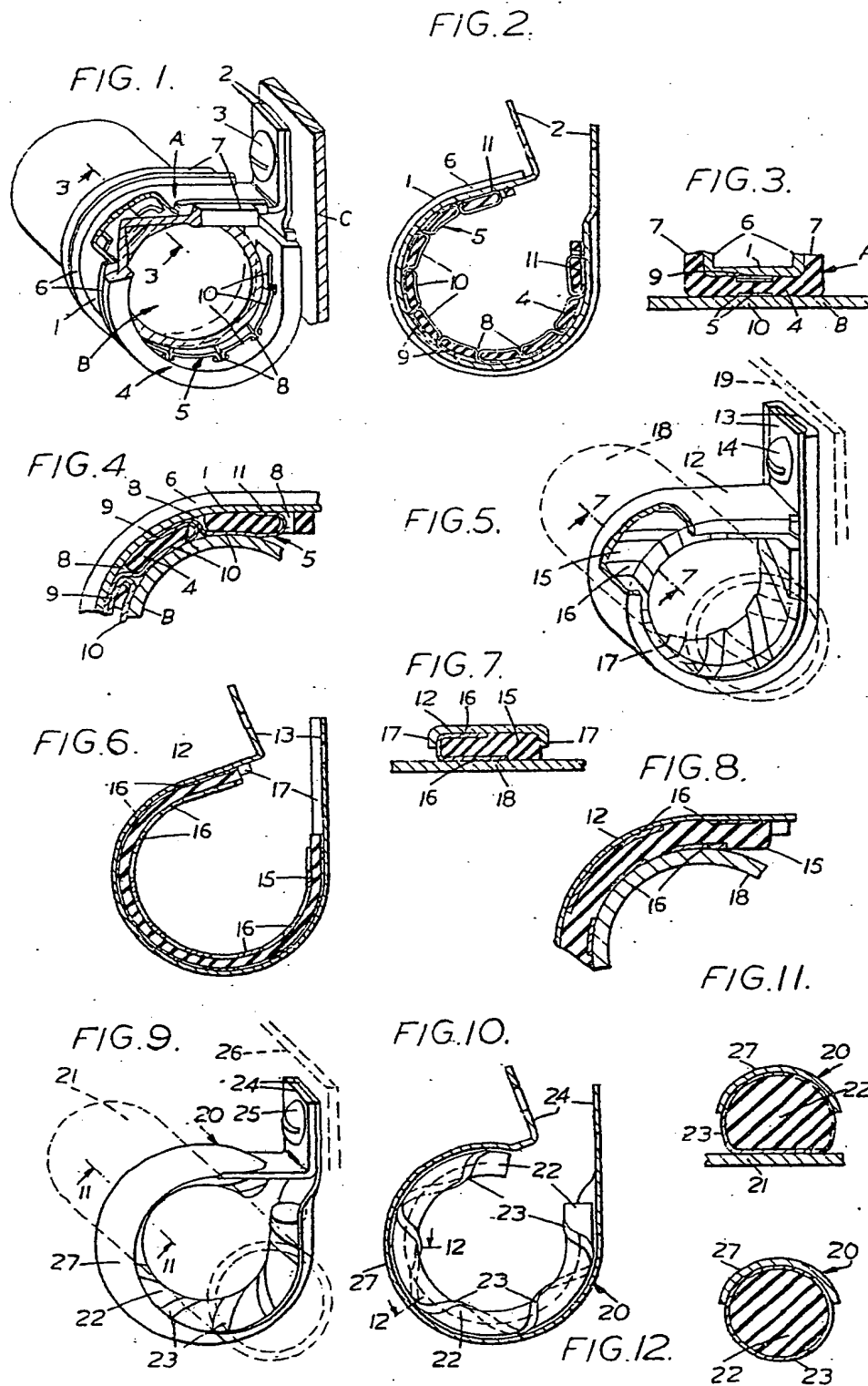
7. A clip, substantially as described and shown, and for the purpose set forth. 100

Dated this 25th day of October 1943.  
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